Linking songbird point counts to forest management through habitat mensuration

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- **Tom—"Forest mensuration" as the basis for planning and management of forested habitats**

- **Bob—Five habitat metrics that can greatly increase the value of songbird data as a response variable to forest management**

Current disconnect

- BBS and off-road point counts currently characterize habitat for a step-down ecological classification as part of a regional or continent-wide program

- Forest managers often asked to quantify a subset of vegetation (merchantable products) that provide revenue to the land owner, whether public or private

Who cares, and why?

- ADF&G has public trust responsibility and USFWS has treaty obligations for maintaining many non-game species

- Forest managers are criticized for timber harvest decisions (temporal and spatial) and seek the help of wildlife managers in proposing and evaluating Best Management Practices

- Forest bird guilds or communities are efficiently sampled as indicators of ecosystem structure and function

- In boreal forest we lack understanding of habitat differences between stand features and stand age (e.g., are cavity trees attractive because of their structure alone or the stand age?)

Volume (not number of trees) is the currency of most forest

managers

- Alaska Constitution requires Sustained Yield of renewable resources, which is expressed as Annual Allowable Cut (AAC) for timber on State lands

- Fiber in AAC calculations is expressed as ft^3 or m^3; timber may be expressed as board feet (144 in^3)

- Commercial forest land has growth of ≥20 ft^3/acre/year

Volume-related metrics

- Diameter at breast height (dbh)—measured 4.5 ft above ground or root collar on uphill side of tree

- Basal Area—tree area at dbh per area of ground (stocking index that affects growth rate via competition)

Traditional forest management focused on growth rate and rotation period

- Optimize ($) the mean annual increment of radial growth to shorten rotation (at least for pulp fiber)

- Active management of growth rate through planting density, thinning, fertilizing, controlling competition

Note: foresters focus on stands, not individual trees

How does an inventory (landscape-scale) or a cruise (stand-scale) characterize the forest?

- Cover classes from remote sensing:
  - Viereck level III possible with minimal truthing
  - Focus on commercial tree species (other types not cut)

- Timber inventory size classes (interior Alaska):
  - Saw-timber: conifers ≥9 in, deciduous ≥11 in dbh
  - Pole-timber: conifers 5.0-8.9 in, deciduous 5.0-10.9 in
  - Saplings 1.0-4.9 in dbh (advanced regeneration)
  - Seedlings <1.0 in dbh (reforestation standards…)

Comparison of techniques:

BBS/points

- Cover class-Viereck IV
- Tree and shrub canopy cover (%) by height class, herb and moss cover

- Water proximity
- Soil type/moisture

Timber cruise
- Cover class-Viereck III (from photos), Viereck IV (on ground)
- Density (stems/ac), height, and diameter of live trees
- Defect (merchantable)
- Snags (sometimes)

Proposed habitat features to link bird response with forest planning

- Topographic position or landform (e.g., floodplain or upland)

- Snag density, height, and size distribution

- Live tree density, height, and size distribution

- Age of stand (definition of "old growth")

- Visual categorization of commercial vegetation types

Snag and live tree density, height, and size distribution

- Snags:
  Indices of habitat suitability for snag dependent species (avian and mammalian)

- Live trees:
  Used for vegetation classification and forest inventories

- Height:
  Measured with a clinometer or laser rangefinder

- Density and size distribution:
  Measured with fixed area plots or wedge prism, along with diameter tape, logger's tape, or caliper

Vegetation classification: Timber inventories

- Classification based on dominant and codominant tree species, canopy closure, and dbh

= Level IV of Viereck et al. classification with additional information on tree size-class (e.g. closed white spruce sawlog; open white spruce -balsam poplar pole-

timber)

Tree size classes (may vary by region)

- Saw-timber: conifers ≥9 in., deciduous ≥11 in. dbh
- Pole-timber: conifers 5.0-8.9 in., deciduous 5.0-10.9 in. dbh
- Saplings 1.0-4.9 in. dbh (advanced regeneration)
- Seedlings <1.0 in dbh (reforestation standards)
- Mixed-species stands can have a mixed size class
- Measured with a diameter tape, logger's tape, or caliper

Additional thoughts

- BBS likely to "undersample" commercial forest types (random sampling)
- Black spruce forests likely to be "oversampled"
- Bird crews collect additional information only in commercial forest types (only 20-30% of land area in interior Alaska)
- Minimum stand size of 5 acres, plot at least 100 ft. inside stand edge (GPS error)
- Representative photos, person for scale
- Site description (checklist prompts)
- Bird plot data applicable to hazardous fuels mapping project
- Stand age data useful for upcoming panel discussion on old-growth in the Interior (seeking to recommend Best Management Practices)